Survey on Learning analytics system for assessing student's performance in online education

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Abstract-Whenever we talk about e-learning one thing which comes on mind is less interaction between teacher and student which also make difficult for teacher about the student's performance assessment. The main focus of our paper is to overcome these loopholes by implementing a new learning analytics system that will help the teachers & developers to create a mutually understanding environment and thus making the student-teacher interaction easier. Our proposed system for Learning Management System will help in observing online interaction among the participant (or student) and help teacher and researcher to analyze interaction of student and assess them. It can be easily combined into Moodle. Semantic similarity among text is a important part related to finding meaning of synonyms in question answer checking. Different sentences having the same meaning(semantic), will be identified & eliminated by mining text. It will help us during the interactive sessions to identify similar questions with the help of some algorithms

Index Terms--*Learning management system (LMS) ,Learninganalytics, Log analysis, Sentence similarity, Ontology, Text Mining.*

I. INTRODUCTION

Learning analytics gives higher education valuable insights that can inform strategic choice-making releted resource allocation for educational improvement. Research demonstrates that learning management systems (LMS) can improve student awareness of community, support-learning communities and boost student engagement and success, and LMS have therefore become core enterprise component in many universities [1]. Learning Analytics will give strong analytics tools for instructor and researchers in order to support them in the repeatative process of improving the effectiveness of their courses management and to laterally upgrade their students' performance quality.

Along the way to meet this challenge, teachers and researchers enrich the traditional teaching paradigm by building a technology enhanced learning environment. Most often, they are using learning management systems (LMS) as the cornerstone of such environments. So, they design well managed learning scripts which require from students to engage into sophisticated collaborative learning and problem solving task such as individual and group activity, coexisting of knowledge and skills through collaboration and social media, communication information, as well as use of various online educational resources, etc.[2]

The assessment of students' performance quality in such technology upgrading learning scripts is a lazy and a time wasting process for the teachers and researchers, who should take into consideration a large amount of performance hint. The process of assessment involves developing accurate authentic assessment task and collecting information from a variety of resources such as discussions log files, project deliverables and creation task in order to come up to a rich and valuable understanding of student learning and behavior in the learning environment. Our research main focuses on handling available LMS logs to give learning activity tracking. One desirable way in which LMS log data can be used is to anticipate learning activity data through a more user friendly graphical interface. This interface is updated in real-time to reflect different activities, also is seamlessly integrated into LMS. Using this Graphical User Interface (GUI), instructors can achieve an understanding about the tasks of the class or can focus on a particular student or different groups activities. Students can utilize the interface to know how their progress compares to the whole class. Our assumption is that the opportunity of this web graphical interface can provide important insight into how students are accessing online course resource.

Higher education (HE) institutions require a costless and easily acceptable online learning management system (LMS) which can increase the learning and teaching involvement of participants and, at the same time, reduces the designing and operational cost. Unlike many trading proprietary learning management systems,Student Learning System supported LMS solution. In this paper we try to discuss the strategic method to reduce the development and operational challenges in maintaining system.

The rest of this paper is organized as follows. In the next section we outline the people, systems and

tools involved in governing Moodle in a typical HE environment. Then we discuss about the suitable development techniques as following a eight-week development and designing, deployment model. In the next section, with the help of two case studies we describe our involvement of a Moodle upgrade following the previously discussed model. We also describe a few operational methods and a review of literature works. Finally, we conclude this paper by discussing some key points and lessons learned from our case studies.

II.   RELATED WORK

1. R. Mazza, a "Monitoring an online course with the GISMO tool: A case study"

The word GISMO stands for Graphical Interactive Student Monitoring Tool for Moodle. This is a visualization kind of tool for the Moodle. With the help of moodle(containing the log data) we can process them,& the teacher examine'sbehavioural patterns of the student interactions after representing it graphically. A report is generated, it shows statistical data & gives a general idea about all students.

2. Riccardo Mazza, Marco Bettoni, Marco Faré, Luca Mazzola. MOCLog –Monitoring Online Courses with log data.

The log data present in the moodle must be analyzed to ensure proper data representation.So, analysis & presentation is done by MOCLog for log data.Using some components of GISMO this tool was developed.Hence, statistical data & reports are produced by reusing some GISMO components. It is used for distinguishing users by their role (course manager – teacher –student).

3. B. Jelen, "Pivot Table Data Crunching: Microsoft Excel 2010"

We can produce the learning statistics incoming from the moodle using the excel pivot tables.The data in the log files is exported itself by the moodle in Excel through which user feeds data & creates pivot table. The graphics oriented result is called "summative table report". This tool helps the user to easily organize huge amount of data.

4. F. C. Sampayo, Analytics and Recommendations.

It is an additional plugin which is inbuilt in Moodle which can be accessed by the students and teachers. It monitors students involvement in each online course activity with the help of tables and graphs. After tracking students involvement it

recommends certain activities using information provided by the tables and graphs.
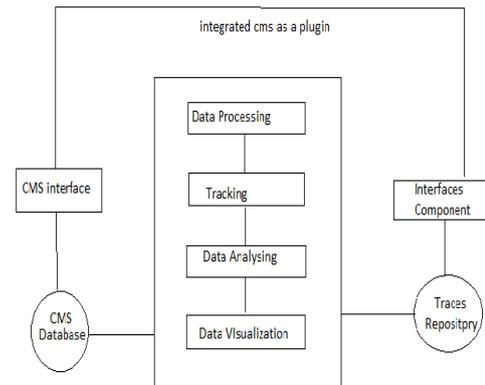
III.   SYSTEM ARCHITECTURE

Fig. System Architecture

Our system is based on the basic learning management system or we simply call it as LMS. LMS doesn't include functions for auditing logs of activities performed by students. Also does not work for evaluation of participatory levels, assessment support performance text is on learning management systems. The semantic meaning between the words of text is measured, It is very much of importance that what is the discussion trend is and to find coherence degree in the same trend.

Learning management system is application for administration and documenting, we also call it as e-learning. All learning forms or aspects are covered in the LMS, course registration, administration, reporting results also analysis of various phases, etc. Of course we can have various advancements in our basic LMS system in today's evolving web industry.

So let's talk about our proposed system. We divided the system into the following subparts:
A) Analysis of user/student activity
B) Monitoring involved students
C) Based on meaning of semantics of text patterns

Our system uses various indicators that are included in the tool structure. Some of the indicators are
1)   Users activities reports summary
2)   Communication activities in the courses
3)   Tool for analysing information discussed
Let us discuss one by one.

1) Users activities reports summary [1]:
Reports of the user activities help us to understand how students interact with the learning system. It is important to know the progress of the students by assessing their performance based on current activities. There are many layers of data collection available to in the LMS that will show participation, engagement and achievement.

If you know where to find all the file sets, it's possible to look over student communication with study materials and other methodologies of your subject, as well as interrogating student assessment, performance and staff feedback.

This tool summarizes some of the methods and techniques for finding and interpreting this data. Performance dashboard is the area where you will be capable to see a full list of subject representative and information on:
• Date and time of last access by participants.
• Number of Review Status component that have been viewed.
• Map of items present to that person through adaptive release.
• Discussion board tasks summary, including ability to click through to see all posts by that member or to grade posts.
• All grades.

2) Communication activities in the courses:
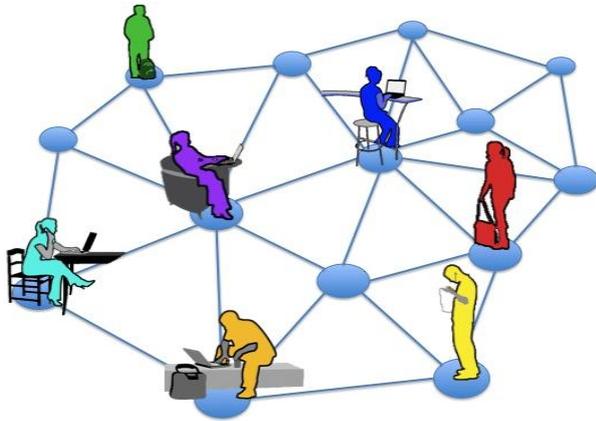
The most significant reason for use of learning management system is the nature of communication it provides. We can also include parents in the discussion forums, which can be the effective step for growth of the performance of students. This is going to be the very transparent way of parent and student interaction. The benefit of the online communication is, the teacher or trainer can communicate to parents instantly through system inbuilt features.

You can communicate to the students through a number of tools:
  a) Notification go to all students, with the choice of emailing students at that time.
  b) All students via course blogs

c) Public journals or a discussion board.

These interaction tools have multiple levels of secrecy, depending on group settings. Using the 'Notification' tool makes it possible for both you and the students to access your announcements from any device. Instructors have the option of both posting an notification, but also sending an messages to all student's email addresses. You can attach a link in your 'Announcement' to any area in your in website or to an attachment (Word document, or PDF) that is emailed to the students. However, they will required to login to the system to access the attachment.

We will see now blogs. Blogs are public sequential posts. These posts are show according to date of entry. Blogs in the systems are only accessible to people registered and by default can be seen by all registered students. Course blogs can be used as an ongoing collection of instructions of media corresponding to the course. All students are allowed to post or comment on a blog by default. It is good to feast insertions on blogs as 'public'. Blog posts can be changed after posting.

Let's talk about Discussion Boards. You can make discussion forums and threads in particular unit websites, and add a 'subscribe' method so that students (and yourself) can get the emails when there are new postings. You can make students 'mediator' in a discussion board, and enable 'ratings' for posts.

3) Tool for analysing information of user activity:

The overall system of learning is based on the communication between the participant students.The reports of the debate should be tabulated and arranged .This will need to clear the flow of textual debate on forum discussions. We can get all information about node from The indicator that features the statistical data related to different activities of a participant student on a group discussion.

The main objective of such indicator is to provide an overview of the following activities: Interpretation of messages.Assessing course syllabus assignments that are posted in the forum.Posting new messages. Replying to messages and documents participated.

IV. SCOPE OF SYSTEM

1. Contact Online with E-learning Platforms LMS likeMoodle, Integrated into LMS as a Plugin
2. Understand the flow of conversation on asynchronous discussions System.
3. Materialization of a different agent to help teachers and researchers in a good collaborative work environment.
4. It provides aggregated different statistical reports.
5. It visualizes the results, which makes comparisons between multiple students or all groups much easier.

6. Displaying the activities that a student has performed also identifies the materials a student has not yet viewed

7. It has the capability to remind students to view all resource that they have not yet downloaded.

8. Semantic Similarity Measure of text Using Information Content and Depth Approach For Similarity

9. Content analysis of texts messages.

10. Finding the relevance of the relationship between two messages.

11. Advising teachers and researchers to help them manage distance classes is required to notify them about the different students' knowledge status.

V. CONCLUSION

Learning Analytics is an rising new research field withmany tools, which offer many valuable services to educatorsfor monitoring and tracking learners' interactions in onlinelearning environments. This research is to design andimplement application to observe students' online learningactivities based on LMS logs and semantic similarity betweensentences in messages post based on semantic and word orderinformation. Semantic similarity is derived from a lexicalknowledge base and a core. The lexical knowledge basemodels common human knowledge about words in a naturallanguage this knowledge is usually steady across a wide rangeof language application areas A collection reflects the actualusage of language and words. LMS and made some smallinterface changes to Moodle. Intuitively, the presence of thesystem popularity bars should motivate students to check thecourse materials more regularly and promptly if he or shesees most of their colleague have already done so. Ourhypothesis is that the availability of system statistics willpositively affect both how an trainer adapts the course andhow students study. Monitoring student learning activity is anessential component of good quality education, and is one of the major seer of effective teaching (Cotton, 1998) [13].Research has shown that letting a learner know his or herposition in ranking in the group results in more effective learning. Thisapplication gives a possible means for students and thetrainer to get this response. Future work will build asmart student profile from different activities on LMS(Excellent, V-Good, Good, Poor). The messages will Classifyin online discussion semantic, by the messages categories(Seminar, Question, Argumentation, Counter- Argumentation,Others).

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